

## **Input to the NITRD request for its' Strategic Plan**

*August 25<sup>th</sup> 2008*

The Open Science Grid (OSG) serves high throughput collaborative science by providing a national distributed infrastructure in the US, federating with other national and international cyber-infrastructures to meet the needs of broad communities of science and research at all scales. The OSG vision is of a sustained, growing infrastructure which transcends administrative boundaries and scientific domains, and through practical application of advanced IT technologies and methodologies contributes to the ubiquitous and democratic use of a global, shared, distributed computational eco-system for scholarship, disseminated to society and industry at large.

The technical directions and principles of the OSG are driven by the needs of the stakeholders: the Large Hadron Collider (LHC) about to start a two decade research program at CERN, the Laser Interferometer Gravitational Wave Observatory (LIGO) which is on the edge of being upgraded to LIGO providing more than 10 times the sensitivity, and the chemists, biologists, climate and other applications groups that are collaborating and contributing to the OSG Consortium.

Towards these goals we input the following components to the NITRD strategic plan:

- 1) *R&D in the manageability and integration of advanced networks and middleware* providing distributed compute and data management technologies to provide more effective and usable heterogeneous end-to-end systems for researchers – from small groups of ad-hoc collaborators to large multi-national scientific initiatives: Improving the intelligence of routing and bridging components to enable seamless use across administrative and technological (performance, capabilities) domains.
- 2) *Cross-agency development and implementation projects which address the full life-cycle computational needs of the scientific research community.* A particular need is the integration of the nation's high performance and leadership class facilities at DOE and NSF with the campus infrastructures being deployed at 100s of the nation's universities. The research life-cycle increasingly relies on the full spectrum of computational scales.
- 3) *R&D into interoperation of Federated cyber-infrastructures at all scales - local to worldwide.* Interfacing/Routing/ Bridging between autonomous self-managed infrastructures nationally and internationally. (cf network bridges/ routers - at the next "transport" or service layer up the end-to-end stack). These approaches will increase our national competitiveness in the global research economy.
- 4) *R&D addressing the sociology, governance, practice and technical needs of Collaborative Research Communities at all scales.* This include leading the way in

understanding how to conduct international treaties and collaborations for open shared cyber-infrastructures. We have existing examples in the production systems of the large physics and astrophysics collaborations that can be built on for other scientific domains.

- 5) *Internationally co-sponsored partnerships of small targeted research projects* targeted specifically to augment and prove the R&D and enable ad-hoc, dynamic, innovation and discovery. These would stimulate focused activities for independent researchers globally to find each other and collaborate democratically on shared hypotheses. This builds on the experience and successes of NITRD in working across multiple agencies in the national arena.